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NAVY REGION SOUTHWEST
REGIONAL EMERGENCY MANAGEMENT PROGRAM

Annex L

Hazard Analysis Program

1. **Purpose.** The purpose of this annex is to introduce a quantitative method for analyzing hazards and to use that methodology to examine and up date or create a sub-regional emergency management plan.
2. **Discussion**
 - a. In order to create a sub-regional emergency management plan, sub regions must be able to identify and determine the degree of threat that is posed by each of the hazards (natural, technological, civil or political) that potentially threatens the sub-region area of responsibility. By conducting hazard analysis using the forms in this program, comparing data will better prepare the command for responding to any emergency.
 - b. A hazard analysis is intended to determine:
 - (1) What can occur.
 - (2) How often it is likely to occur.
 - (3) How bad is it likely to affect the area of responsibility.
 - (4) How vulnerable the area of responsibility is to the hazard.
3. **Action**
 - a. All sub-regions shall conduct a current hazard analysis of their area of responsibility using the forms provided in this annex and create scenarios as describe in this plan.
 - b. All data compiled shall be maintained, reviewed and updated when appropriate on an annually bases for each sub-region area of responsibility.
4. **Process.** The hazard analysis process shall be as follows:

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a. **Identification.** Develop a list of hazards that may occur within each sub-region's area of responsibility based on historical data about past events. Recent or very costly events is relatively easy to gather, while information about older, less costly events may be more difficult to find.

b. **Classification**

(1) Hazards can be classified into three groups:

- (a) Natural hazards
- (b) Technological hazards
- (c) Civil or political hazards

(2) A hazard analysis should consider hazards in all three groups as well as the possibility of cascading emergencies-situations when one hazard triggers others in a cascading fashion.

c. **Profile.** Develop a hazard profile for each hazard using the hazard profile worksheet form in this annex. Each profile should include the following information about the hazard:

- (1) Frequency of occurrence.
- (2) Magnitude and potential intensity.
- (3) Location where the hazard is likely to occur.
- (4) How large an area it the hazard likely to affect.
- (5) How long the hazard can be expected to last.
- (6) The time of the year that the hazard is more likely to occur.
- (7) How fast the hazard is likely to occur.
- (8) How much warning there is, and whether a warning system exists.

d. **Area of Responsibility.** Develop an area of responsibility profile (demography patterns, housing, industry areas, historic buildings, language, schools etc.).

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e. **Vulnerability.** Determine the vulnerability using hazard profile worksheet form indicated in Figure L-1.

f. **Scenarios.** Create and apply scenarios based priority from the risk index worksheet form.

5. **Area of responsibility Vulnerability**

a. Once sector profiles (from the area of responsibility profile) have been developed, combine the sector profile with hazard specific information from the hazard profile work sheet to determine the area of responsibility's vulnerability to each hazard. Sector files plus hazard specific information equals the determination of vulnerabilities.

b. After hazard information and area of responsibility information have been compiled, it is helpful to quantify the area of responsibility's risk so that the planning team can focus the emergency operations plan on the hazards that present the highest risk to the area of responsibility.

6. **Risk**

a. Risk is the predicted impact that a hazard would have on people, services, and specific facilities and structures in your area of responsibility. For and example, in an earthquake, a specific bridge might be at risk. The predicted impact of an earthquake on that bridge could be collapse, leading to restricted access to a critical facility.

b. For the process to be effective, risks must be quantified. Quantifying risk involves:

(1) Identifying the elements of your area of responsibility (populations, facilities, and equipment) that are potentially at risk from a specific hazard.

(2) Developing response priorities.

(3) Assigning severity ratings.

(4) Compiling risk data into area of responsibility risk profiles.

c. For each hazard, survey risk related factors in each sector in the area of responsibility to develop a composite picture of overall risk. Risk related factors include:

(1) Geographic features (topography and soil composition).

(2) Infrastructure lifelines (communication, transportation systems, utilities, etc.).

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- (3) Essential facilities (police and fire stations, medical facilities, shelters, etc.).
- (4) Special facilities (schools, childcare facilities, healthcare facilities, high ranking officials, etc.).
- (5) Hazardous material storage facilities and/or transportation routes.
- (6) Property characteristics (land use, type of construction, and type of area of responsibility).
- (7) Population densities and shifts.
- (8) The availability of response resources.

7. **Response Priorities**

- a. When surveying risk, it is helpful to develop response priorities as follows:
 - (1) Priority 1 - Essential facilities.
 - (2) Priority 2 - Life and safety.
 - (3) Priority 3 - Infrastructure lifelines.
- b. When identifying and organizing risk factors within the area of responsibility, the risk assessment worksheet (Figure L-2) shall be filled out for all types of hazards to obtain information that is consistent and thus comparable.
- c. It is critical to consider potential hazards that are located in neighboring areas of responsibility if they pose a threat locally. For example, a dam that is located in a neighboring county or state could cause local flash flooding if it failed.

8. **Assigning Severity Ratings**

- a. Assigning a severity rating to each hazard will quantify, to the degree possible, the damage that can be expected in the area of responsibility as a result of that hazard.
- b. Note that the rating quantifies the expected impact of a specific hazard on people, essential facilities, property, and respond assets.

9. **Compiling Data into an Area of Responsibility Risk Index.** Use the risk index worksheet indicated in Figure L-3 for cross-reference the following types of hazard data:

- a. Magnitude.
- b. Frequency of occurrence.
- c. Speed of onset (warning time).
- d. Area of responsibility impact (severity rating).
- e. Special characteristics and planning considerations.
- f. Priority.

10. **Creating and Applying Scenarios.** The final piece in the hazard analysis process is to develop scenarios for the top-ranked hazards (or those that rank above a certain threshold) that lay out hazard's development into an emergency. Note that this is a brainstorming activity based on the area of responsibility profile and hazard data that have been compiled. The types of information that should be addressed in the scenarios are as follows:

- a. Initial warning.
- b. Overall impact on the area of responsibility.
- c. Impact on specific sectors.
- d. Consequences (damages, casualties, loss, of services, etc.).
- e. Needed actions and resources.

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HAZARD PROFILE WORKSHEET	
TYPE OF HAZARD:	<input type="checkbox"/> NATURAL <input type="checkbox"/> TECHNOLOGICAL <input type="checkbox"/> CIVIL <input type="checkbox"/> POLITICAL
COMMAND NAME AND ADDRESS (Including zip code):	SUPPORTED BY: <input type="checkbox"/> REGION <input type="checkbox"/> SUB-REGION ____ (NUMBER)
POTENTIAL MAGNITUDE: (Percentage of the area of responsibility that can be affected): <input type="checkbox"/> CATASTROPHIC (More than 50 %) <input type="checkbox"/> CRITICAL (25 to 50 %) <input type="checkbox"/> LIMITED (10 to 25 %) <input type="checkbox"/> NEGLIGIBLE (Less than 10 %)	
FREQUENCY OF OCCURRENCE: <input type="checkbox"/> Highly likely (Near 100 % probability in next year) <input type="checkbox"/> Likely (Between 10 and 100 % probability in next year, or at least one chance in next 10 years) <input type="checkbox"/> Possible (Between 1 and 10 % probability in next year, or at least one chance in next 100 years) <input type="checkbox"/> Unlikely (Less than 1 % probability in next 100 years)	
SEASONAL PATTERN :	
AREAS LIKELY TO BE EFFECTED: (By sector):	
PROBABLE DURATION:	
POTENTIAL SPEED OF ONSET (Probable amount of warning time): <input type="checkbox"/> MINIMAL OR NO WARNING <input type="checkbox"/> 6 TO 12 HOURS WARNING <input type="checkbox"/> 12 TO 24 HOURS WARNING <input type="checkbox"/> MORE THAN 24 HOURS WARNING	
EXISTING WARNING SYSTEMS:	COMPLETE VULNERABILITY ANALYSIS: <input type="checkbox"/> YES <input type="checkbox"/> NO
	DATE OF PROFILE:
	APPROVED BY:
NOTE THAT SOME HAZARDS MAY POSE SUCH A LIMITED THREAT TO THE AREA OF RESPONSIBILITY THAT ADDITIONAL ANALYSIS IS NOT NECESSARY	

Figure L-1

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RISK ASSESSMENT WORKSHEET	
COMMAND NAME AND ADDRESS (Including zip code):	
SUPPORTED BY: <input type="checkbox"/> REGION <input type="checkbox"/> SUB-REGION _____ (Number)	
SECTOR	ESSENTIAL FACILITIES AT RISK (Response priority 1)
SECTOR	POPULATION AT RISK (Response priority 2)
SECTOR	INFRASTRUCTURE (Response priority 3)
PROPERTY AT RISK:	
EXPECTED EXTENT OF DAMAGE:	
SEVERE	% OF SECTOR PROPERTY: _____
SUBSTANTIAL	% OF SECTOR PROPERTY: _____
LIMITED	% OF SECTOR PROPERTY: _____
NONE	% OF SECTOR PROPERTY: _____
APPROVED BY:	DATE OF COMPLETION:

Figure L-2

RISK INDEX WORKSHEET						
HAZARD	FREQUENCY	MAGNITUDE	WARNING TIME	SEVERITY	SPECIAL CHARACTERISTICS AND PLANNING CONSIDERATION	RISK PRIORITY
	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
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	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
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	▸ Highly likely ▸ Likely ▸ Possible ▸ Unlikely	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible	▸ Minimal ▸ 6-12 hours ▸ 12-24 hours ▸ 24 + hours	▸ Catastrophic ▸ Critical ▸ Limited ▸ Negligible		
HIGH						
MEDIUM						
LOW						

Figure L-3